

AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions and listings of the claims in this application.

LISTING OF THE CLAIMS:

Claims 1-34. (Canceled)

35. (Currently Amended) A method of transmitting a digital data stream in a digital wireless communications system, the method comprising the steps of:

converting said digital data stream into a first stream of information symbols having four or more signal points on a signal constellation defined by a modulation scheme which is either QPSK or 2^m -QAM (m being an integer and takes a value of 3 or more) ;

generating a pilot symbol of which a signal point on the signal constellation has an amplitude larger than amplitudes of possible signal points of the first stream on said signal constellation and differs in phase from a particular signal point of the first stream having a maximum possible amplitude among the signal points of the first stream of the information symbols on said signal constellation, wherein the pilot symbol is always disposed on either an in-phase axis or a quadrature-phase axis in said signal constellation, and further wherein the amplitude of the pilot signal takes a constant value which is larger than that of any possible signal point;

inserting said pilot symbol regularly in said first stream of said information symbols to generate a second symbol stream; and

transmitting a modulated version of said second symbol stream by wireless.

36. (Original) A method as defined in claim 35, wherein said step of generating a pilot signal includes the step of setting said amplitude of said pilot symbol not larger than 1.6 times a maximum possible amplitude of said information symbols.

37. (Previously presented) A method as defined in claim 35, wherein said modulation scheme is a quadrature amplitude modulation.

38. (Previously presented) A method as defined in claim 36, wherein said modulation scheme is a quadrature amplitude modulation.

Claims 39 - 40. (Cancelled)

41. (Previously presented) A method as defined in claim 35, wherein said modulation scheme is a quadrature phase shift keying.

42. (Previously Presented) A method as defined in claim 41, wherein said step of generating a pilot symbol includes the step of setting said amplitude of said pilot symbol not larger than 1.6 times a maximum possible amplitude of said information symbols.

Claims 43 - 44 (Cancelled)

45. (Currently Amended) A transmitter for transmitting a digital data stream in a digital wireless communications system, the transmitter comprising:

a converter that is configured to convert said digital data stream into a first stream of information symbols having four or more signal points on a signal constellation defined by a modulation scheme which is either QPSK or 2^m -QAM (m being an integer and takes a value of 3 or more);

a generator that is configured to generate a pilot symbol of which a signal point on the signal constellation has an amplitude larger than amplitudes of possible signal points of the first stream on said signal constellation and differs in phase from a particular signal point of the first stream having a maximum possible amplitude among the signal points of the first stream on said signal constellation, wherein the pilot symbol is always disposed on either an in-phase axis or a quadrature-phase axis in said signal constellation, and further wherein the amplitude of the pilot signal takes a constant value which is larger than that of any possible signal point;

an inserter that is configured to insert said pilot symbol regularly in said first stream of said information symbols to generate a second symbol stream; and

a transmitter that is configured to transmit a modulated version of said second symbol stream by wireless.

46. (Previously Presented) A transmitter as defined in claim 45, wherein said means for generating a pilot symbol includes means for setting said amplitude of said pilot symbol not larger than 1.6 times a maximum possible amplitude of said information symbols.

47. (Previously presented) A transmitter as defined in claim 45, wherein said modulation scheme is a quadrature amplitude modulation.

48. (Previously presented) A transmitter as defined in claim 46, wherein said modulation scheme is a quadrature amplitude modulation.

Claims 49 - 50. (Cancelled)

51. (Previously presented) A transmitter as defined in claim 45, wherein said modulation scheme is a quadrature phase shift keying.

52. (Previously Presented) A transmitter as defined in claim 51, wherein said means for generating a pilot symbol includes means for setting said amplitude of said pilot symbol not larger than 1.6 times a maximum possible amplitude of said information symbols.

Claims 53 - 54. (Cancelled)

55. (Previously Presented) A reception system for receiving said modulated version of said second symbol stream transmitted in accordance with a method as defined in claim 35, the reception system comprising:

a receiver that is configured to receive said modulated version of said second symbol stream;

an estimating unit that is configured to estimate, by said pilot signal, an amplitude distortion of information symbols between said pilot symbol and a next pilot symbol in said second symbol stream;

a removing unit that is configured to remove said amplitude distortion from said information symbols following said pilot symbol in said second symbol stream by using said estimated amplitude distortion to obtain amplitude-distortion-compensated information symbols; and

a deciding unit that is configured to decide a digital symbol associated with each of said obtained amplitude-distortion-compensated information symbols according to said signal constellation.

56. (Previously Presented) A reception system for receiving said modulated version of said second symbol stream transmitted from a transmitter in accordance with a method as defined in claim 35, the reception system comprising:

a receiver that is configured to receive said modulated version of said second symbol stream;

an estimating unit that is configured to estimate, by said pilot signal, a phase error in said second symbol stream;

a phase compensating unit that is configured to compensate said second symbol stream for said phase error by using said estimated phase error to obtain compensated information symbols; and

a deciding unit that is configured to decide a digital symbol associated with each of said obtained compensated information symbols according to said signal constellation.

57. (Previously presented) A reception system as defined in claim 55, further comprising:

an estimating unit that is configured to estimate, by said pilot signal, a phase error in said second symbol stream, wherein

said removing unit has a phase and amplitude compensating unit that is configured to compensate said second symbol stream for said amplitude distortion and said phase error by

using said estimated amplitude distortion and said estimated frequency offset to obtain fading-distortion-compensated information symbols, and

said deciding unit is configured to decide a digital symbol associated with each of said obtained fading-distortion-compensated information symbols according to said signal constellation.

58. (Currently Amended) A method of transmitting a digital data stream in a digital wireless communications system, the method comprising the steps of:

converting said digital data stream into a first stream of information symbols having four or more signal points on a signal constellation defined by a modulation scheme which is either QPSK or 2^m - QAM (m being an integer and takes a value of 3 or more);

generating a pilot symbol of which a signal point on the signal constellation has an amplitude larger than amplitudes of possible signal points of the first stream on said signal constellation, wherein said pilot symbol is always disposed on either an in-phase axis or a quadrature-phase axis in said signal constellation and further wherein the amplitude of the pilot signal takes a constant value which is larger than that of any possible signal point;

inserting said pilot symbol regularly in said first stream of said information symbols to generate a second symbol stream; and

transmitting a modulated version of said second symbol stream by wireless.

59. (Previously presented) A transmitter for transmitting a digital data stream in a digital wireless communications system, the transmitter comprising:

a converter that is configured to convert said digital data stream into a first stream of information symbols having four or more signal points on a signal constellation defined by a modulation scheme;

a generator that is configured to generate a pilot symbol of which a signal point on the signal constellation has an amplitude larger than amplitudes of possible signal points of the first stream on said signal constellation, wherein said pilot symbol is disposed on either an in-phase axis or a quadrature-phase axis in said signal constellation;

an inserter that is configured to insert said pilot symbol regularly in said first stream of said information symbols to generate a second symbol stream; and

a transmitter that is configured to transmit a modulated version of said second symbol stream by wireless.